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ABSTRACT

This paper summarizes a number of generalizations concerning the vowels used in a dialect of English spoken in northwest Arkansas. The generalizations are in the form of ordered rules in line with theories of generative grammar. The concept of an underlying system of diaphonemes is used, similar to that of Rudolph Troike. The primary focus is on vowels; consonants are considered when they are involved in relevant phonetic environments. Tense and lax vowels, and diphthongs are discussed in terms of their appearance in a particular environment. A phonological matrix illustrates the diaphonemes used in the dialect. Some generative rules for pronunciation are provided along with examples, and references are included. (VM)

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SOME RULES FOR THE PRONUNCIATION
OF ENGLISH IN NORTHWEST ARKANSAS

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(Read at the Midwest regional meeting of
the American Dialect Society, November 5,
1971, Detroit, Michigan)

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This paper is an attempt to summarize a relatively small number of generalizations to account for some features of pronunciation in the variety of English spoken in northwest Arkansas. These generalizations are in the form of ordered rules, for the theoretical bias of the analysis is that of generative grammar. This study reflects general compatibility with, and influence by, S. J. Keyser's review of The pronunciation of English in the Atlantic states (1963), Chomsky and Halle's The sound pattern of English (1968), James Sledd's article, Breaking, umlaut, and the Southern drawl (1966), and Rudolph Troike's article, Overall pattern and generative phonology (1971).

The rules postulated in this study constitute a tentative approximation of a fragment of the abstract phonological system of an idealized Arkansas speaker functioning in a relaxed, conversational style. Actual speech of any particular Arkansawyer may yield data in conflict with the phonetic realization of the underlying phonological units. In anticipation of these counter-examples, a few explanations will be suggested. First, the hypothesized rules may be wrong--in their formulation, their ordering, or both. Second, the counter-examples could be products of dialect mixture, whereas these rules describe an unmixed dialect. Third, the data of actual speech may yield the even more unpredictable variation that stems from style shifting. Such counter-examples are welcomed evidence. Obviously, those revealing errors in analysis are prized, but those

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illustrating dialect or stylistic mixture are also valuable, for they enable the investigator to gain insights into the systematic nature of the differences between the rules for one dialect and another or one style and another.¹

It should be stressed at this point that these rules are not the product of a mere game of intellectual leapfrog played in my office on the University of Arkansas campus. Conceptualization is only a part of the input. These rules are based upon data contained in approximately 40 hours of tape recorded interviews, upon the observations of laymen-commentators on Ozark speech such as Vance Randolph (1953) and Charles Morrow Wilson (1959), and upon the author's casual observations made during the past year's residence in Fayetteville, Arkansas. (The author has also trusted his intuitions as a native speaker of a dialect similar in many respects to the one described in this study, i.e., the dialect of northeast Arkansas.)

An underlying phonological system of diaphonemes is posited for the dialect under consideration. The term diaphoneme is used with essentially the same meaning it has in Troike's article, Overall pattern and generative phonology. It is not to be confused with the term as it is used in the works of Hill (1958: 59), Weinreich (1954:395), and Stockwell (1959:262). The diaphonemic system is not as abstract as that of systematic phonemes or morphophonemes, but the diaphoneme is clearly more generalized and abstract than the taxonomic phoneme, with which it should not be equated or confused.

The postulated system is set forth on the phonological matrix, though the present rules focus primarily upon the vowels with some attention to glides and liquids. True consonants are considered at this time only when they are involved in relevant phonetic environments for the rules.

The vocalic portion of the matrix consists of six tense and seven lax vowels. The tense vowels are $|\text{ɪ}|$ in beat, $|\text{e}|$ in bait, $|\text{u}|$ in boot, $|\text{o}|$ in boat, $|\text{ɔ}|$ in bought, and $|\text{ɑ}|$ in bar. Each of these is paired with a lax counterpart: $|\text{ɪ}|$ in bit, $|\text{ɛ}|$ in bet, $|\text{ʊ}|$ in put, $|\text{ʌ}|$ in but, $|\text{ɒ}|$ in British pot (this vowel is exploited in this dialect only in the $|\text{ɒ}|$ diphthong at the diaphonemic level), and $|\text{ɑ}|$ in cot. The seventh lax vowel, $|\text{æ}|$ in bat, has no matching tense vowel at the diaphonemic level. Three diphthongs, all with lax initial elements are recognized: $|\text{aɪ}|$ in buy, $|\text{aʊ}|$ in bow, and $|\text{ɔɪ}|$ in boy. In addition to vowels the matrix provides for "true" consonants, for two liquids ($|\text{r}|$ and $|\text{l}|$), and for three glides ($|\text{h}|$, $|\text{y}|$, and $|\text{w}|$). These glides are not recognized in this analysis as vocalic offglides; the offglides are $[\text{+vocalic}]$ --the centering $|\text{ə}|$, the palatal $|\text{ɪ}|$, and the velar $|\text{ʊ}|$, which are $[\text{+vocalic}, \text{-tense}, \text{±back}, \text{±high}]$.

THE LAX VOWELS

The lax vowel $|\text{ɪ}|$ is characterized by centering offglides before most consonants. The offglide occurs before all $[\text{-high}]$ consonants (all stops but $|\text{k}|$ and $|\text{g}|$, before fricatives, and before both $[\text{+anterior}]$ nasals. Some examples are tip $[\text{tɪəp}]$, bid $[\text{bɪəd}]$, live $[\text{lɪəv}]$, and pin $[\text{pɪən}]$. In two environments, before $[\text{+high}, \text{+continuent}, \text{+strident}]$ consonants (as in fish and dish) and before nasal + affricate clusters (as in pinch, inch, and singe) the vowel becomes $[\text{+tense}]$. Elsewhere (before $|\text{k}|$, $|\text{g}|$, $|\text{ʃ}|$, $|\text{ʒ}|$ and liquids and in word-final positions), the vowel is a monophthong $[\text{ɪ}]$.

Like $|\text{ɪ}|$, the lax front vowel $|\text{ɛ}|$ has a centering offglide before $[\text{+high}]$ consonants, yielding such pronunciations as $[\text{stɛəp}, \text{wɛəb}, \text{bɛət}, \text{bɛəd}]$ for step, web, bet, and bed. This vowel also becomes $[\text{+tense}]$ before $[\text{+high}, \text{+continuent}]$

+strident] consonants (fresh and measure), and also before |g|, as in leg, beg, and egg. Before nasals |l| and |ɛ| merge as |l|. Pen is [pɛn].

The low front lax vowel |æ| becomes [+tense] in three environments: before nasal + consonant clusters, before [-voice, +continuant] consonants, and before [+high] stops (|k| and |g|). Like the other tense front vowels, [+tense] |æ| develops a palatal offglide (and a lax initial element) in the pronunciations [pæiθ, læɪf, æɪʃ, dəɪns, ræɪg] (path, laugh, ash, dance, and rag). When followed by the offglide and a [+nasal] consonant, the low vowel optionally raises to |e| before laxing. Thus pants may be either [pænts] or [peɪnts]. In other pre-consonantal environments |æ| has a centering offglide as in [kæp, ræn, hæv] (cap, ran, and have).

The [+high, +back, -tense] |ʊ| has two offglides, a centering offglide before [+anterior] stops (coop, hood, and foot are [kʊp, huəd, fuət]) and a palatal offglide before [+high, +continuant] consonants. Bush and push are [buɪʃ] and [puɪʃ].

The merger of |l| and |ɛ| before nasals has already been mentioned, but another coalescence of front vowels occurs in a nasal environment. All front vowels merge as |e| ([-high, -low, +tense]) before |ŋ|. As a result think is identical to thank; sing is identical to sang.

THE TENSE VOWELS

The [+high] or [-round] tense vowels |i|, |e|, |u|, and |ɪ| become [-tense] before |r|, but |u| frequently merges with |o| and is thus exempt from the laxing rule. If the [+tense] vowel is maintained before |r|, as |o| and |ɔ| are, these vowels do not have matching offglides. Otherwise, all [+tense] vowels have such offglides. One interesting feature of the dialect, however,

is the laxing of the vocalic peak when accompanied by a [-tense] offglide. Stressed or is [ɔr], with a [+tense] vowel and no offglide, but on is [ɒn], with a [-tense] initial element followed by a velar offglide. It should also be noted that on and own are not homophonous, contrary to popular belief. The two [-low, +back, +tense] vowels [u] and [o] develop centering onsets, a feature not shared by the [+low, +back, +round] vowel. Thus own is [əʊn], but on is [ɒn]. Finally, when [u] follows [+coronal] stops, a palatal onglide intrudes. Tune is [tʰuən].

DIPHTHONGS

The [aɪ] diphthong has two pronunciations. In word-final position the diphthongal character is preserved, but elsewhere the pronunciation is monophthongal. When the offglide is retained it is "shortened" from [+high] to [-high]([ɛ]). The initial element of the diphthong and the monophthongal variant are both fronted to [a]. In old-fashioned speech, [ɪ] is deleted before [r], and the [a] is not fronted. Tire in old-fashioned speech is [tar], contrasting with [tar] in this analysis. Like all English monophthongs, [a] has predictable length; it is long before voiced fricatives, rather long before voiced stops, somewhat long before voiceless fricatives, and short before voiceless stops. Since vowel length is so universally predictable in modern English, the rules postulated in this study do not attempt to account for it. A more complete set of rules, however, would generate the following pronunciations:

<u>rise</u>	[ra::z] (with a tendency for a weak offglide to develop)
<u>ride</u>	[ra:d]
<u>rice</u>	[ra:s]
<u>right</u>	[rat]

The [aʊ] diphthong is monophthongized before [r] , and the [a] is not fronted. When the offglide is preserved, the onset fronts, becoming more advanced than the [a] of the [aʊ] diphthong. It is [+front][ə] . Tower is [tʰəʊ], but house is [həʊs]. This offglide, like all other velar offglides in this dialect, undergoes rounding assimilation.

The [ɔʊ] diphthong retains the offglide in all environments, but it assimilates to [ə] . The offglide is never deleted; [ɔʊ] and [ɔ] do not neutralize. Bail is [bɔʊl], but boil is [bɔɪl].

A NOTE ON THE LIQUID [l]

Various observers of Southern and South Midland speech (e.g., Sledd 1966) have called attention to two varieties of post-vocalic [l] --a "dark" [l], and a "clear" [l̥] . They have also noted the intrusion of the palatal glide before the "clear" (palatal) [l̥] and the velar glide before the "dark" (velar) [l]. And finally, it has been observed that under certain conditions the [l] is deleted. The dialect described in this study shares these three general characteristics with other Southern dialects, but the rules are not the same. For example, in some dialects [l] between two front vowels is "clear", but in north-west Arkansas it remains "dark" or [+back] . Billy is [bɪɪl] Post-vocalic "clear" or [-back] [l̥] is posited only before [+high, -back, -consonantal, -vocalic] segment [y]. However, since the [l] is later deleted, the argument for "clear" and "dark" [l]s rests on the glide which remains. It is [-back], not [+back]. Consider these three names: Will, Willie, and William. Will is [wɪɪl]; the [l] remains [+back] and the glide is also [+back]. Willie is [wɪɪl̥], the [l] and the glide being identical to those in the previous example. But William is different; it is [wɪɪyəm].² This pronunciation is

generated by three rules: first, |l| becomes [-back]. The intrusive glide is, therefore, also [-back]. Then |l| is deleted (the alveolar contact disappearing), but the palatal glide remains. It appears that |l| vocalizes before any [-vocalic] segment (i.e., any true consonant or glide), but under certain conditions it vocalizes in word final position after [+back] vowels, especially in unstressed syllables. Rule #20 is obviously inadequate since it does not account for the latter deletion.

Clearly, much of the phonological system has not been studied, even tentatively. Some problems that remain are:

1. vowels in unstressed syllables
2. the loss of word-final |l|
3. the simplification of word-final consonant clusters
4. the simplification and assimilation of medial consonant clusters
5. the so-called "weakening" of final stops (There is evidence in our tapes and the printed records of devoicing of voiced stops, of voiceless stops becoming glottal stops or disappearing altogether, and of vowels + nasals becoming nasalized vowels only.)
6. initial |hyl| and |hw| clusters
7. initial |ɔ| in monosyllables

NOTES

¹Obviously, I reject Labov's (1969) concept of inherent variability as a means of explaining pronunciation variation in favor of more conservative theoretical assumptions about dialect mixture and style shifting. My position is closer to DeCamp's (1969: 172, esp.) than Labov's. Such variation, as between [pɛən] and [pɪən] for pen, is regarded as the product of dialect or style shifting, not as inherent variability. It is assumed that the rules for a particular style or dialect are an ordered set. Different styles or dialects differ in that they may not share the same rules, they may share identical rules with different ordering, or they may share partially similar rules with differences in contexts, restrictions, etc. Thus, when one's performance is characterized by pronunciation fluctuation, it is assumed that the variation is the result of the speaker's switching, however brief, from the set of rules for one dialect or style to another. For example, if a speaker of the dialect under analysis pronounces tire as [tar] and then at another time as [tɪr], the latter would be considered the product of code switching. He would have not followed Rules 16 and 17, but instead Rule 15', which would belong to another rule set.

15'. $\begin{matrix} \text{ɪ/ʊ} \\ [-\text{tense}] \end{matrix} \rightarrow \emptyset / \begin{matrix} \text{a} \\ [-\text{consonantal}] \\ [+ \text{vocalic}] \\ [-\text{round}] \end{matrix} \begin{matrix} \text{r} \\ [+ \text{consonantal}] \\ [+ \text{vocalic}] \\ [-\text{anterior}] \end{matrix}$

² The symbolization [ɪ] should not be misinterpreted as vowel length, which would be noted as [i:]. The second [ɪ] in this transcription, it will be remembered, is merely a cover symbol for a palatal offglide, the specific tongue height being unspecified.

THE PHONOLOGICAL MATRIX

<u>FEATURES</u>		<u>DIAPHONEMES</u>																																	
		p	b	t	d	k	g	ç	j	f	v	θ	ð	s	z	ʃ	ʒ	m	n	ŋ	r	l	h	y	w	i	e	ε	æ	ɑ̃	ɑ	u	o	ʌ	ɔ
consonantal		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-
vocalic		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+
continuent		-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+
voice		-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
nasal		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	
sonorant		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
anterior		+	+	+	+	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
coronal		-	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
strident		-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
high		-	-	-	-	+	+	+	+	-	-	-	-	-	-	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
low		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
back		-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
tense		-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
round		-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

THE PHONETIC MATRIX

VOWELS

FEATURES

VOWELS

	i	ɪ	e	ɛ	æ	ɐ	ʌ	ɑ	ɔ	o	ʊ	u	y	ɤ	ɐ	ɔ	ɒ
high	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
low	-	-	-	-	+	-	-	-	-	+	-	-	-	+	-	-	+
back	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+
front	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-
tense	+	-	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-
round	-	-	-	-	-	+	+	+	+	-	-	+	+	+	+	+	+

SOME RULES FOR THE PRONUNCIATION
OF ENGLISH IN NORTHWEST ARKANSAS

1. $\begin{matrix} \text{ɪ/ε/æ/ʊ} \\ [-\text{tense}] \end{matrix} \rightarrow \begin{matrix} \text{ə} \\ [-\text{high}] \\ [-\text{low}] \\ [+ \text{back}] \\ [-\text{tense}] \end{matrix} / \text{---} \begin{matrix} \text{r} \\ [+ \text{consonantal}] \\ [+ \text{vocalic}] \\ [-\text{anterior}] \end{matrix}$
- OPT 2. $\begin{matrix} \text{u} \\ [+ \text{high}] \\ [+ \text{back}] \\ [+ \text{tense}] \end{matrix} \rightarrow \begin{matrix} \text{ʊ} \\ [-\text{high}] \end{matrix} / \text{---} \begin{matrix} \text{r} \\ [+ \text{consonantal}] \\ [+ \text{vocalic}] \\ [-\text{anterior}] \end{matrix}$
3. $\begin{matrix} \text{i/e/u/ā} \\ [+ \text{tense}] \\ \{ + \text{high} \} \\ \{ - \text{r'nd} \} \end{matrix} \rightarrow \begin{matrix} \text{ɪ/ε/ʊ/ɑ} \\ [-\text{tense}] \end{matrix} / \text{---} \begin{matrix} \text{r} \\ [+ \text{consonantal}] \\ [+ \text{vocalic}] \\ [-\text{anterior}] \end{matrix}$
4. $\begin{matrix} \text{i/ɪ/e/ε/æ} \\ [-\text{consonantal}] \\ [+ \text{vocalic}] \\ [-\text{back}] \end{matrix} \rightarrow \begin{matrix} \text{e} \\ [-\text{high}] \\ [-\text{low}] \\ [+ \text{tense}] \end{matrix} / \text{---} \begin{matrix} \text{ŋ} \\ [+ \text{nasal}] \\ [+ \text{back}] \end{matrix}$
5. $\begin{matrix} \text{ɪ/ε} \\ [-\text{back}] \\ [-\text{low}] \\ [-\text{tense}] \end{matrix} \rightarrow \left\{ \begin{matrix} \text{i/e} \\ [+ \text{tense}] \end{matrix} / \text{---} \left\{ \begin{matrix} \text{n} & \text{ɟ/ɣ} \\ [+ \text{nasal}] & [-\text{continuent}] \\ & [+ \text{anterior}] \end{matrix} \right\} \right\}$
 $\left\{ \begin{matrix} \text{ɟ/ɣ} \\ [+ \text{continuent}] \\ [+ \text{strident}] \\ [+ \text{high}] \end{matrix} \right\}$
 $\left\{ \begin{matrix} \text{l} & \text{m/n} \\ [+ \text{high}] & [+ \text{nasal}] \end{matrix} \right\}$
6. $\begin{matrix} \text{ε} \\ [-\text{high}] \\ [-\text{low}] \\ [-\text{back}] \\ [-\text{tense}] \end{matrix} \rightarrow \begin{matrix} \text{e} \\ [+ \text{tense}] \end{matrix} / \text{---} \begin{matrix} \text{g} \\ [+ \text{consonantal}] \\ [-\text{vocalic}] \\ [+ \text{voice}] \\ [+ \text{high}] \end{matrix}$

$$7. \begin{array}{c} \text{æ} \\ [+low] \\ [-back] \\ [-tense] \end{array} \rightarrow [+tense] / \left\{ \begin{array}{l} \text{f/θ/s/ʃ} \\ [+continuent] \\ [-voice] \\ \\ \text{k/g} \\ [+consonantal] \\ [-vocalic] \\ [+back] \\ \\ [+nasal] [+consonantal] \\ [-vocalic] \end{array} \right\}$$

$$8. \emptyset \rightarrow \begin{array}{c} \text{ə} \\ [-high] \\ [-low] \\ [+back] \\ [-tense] \end{array} / \begin{array}{c} \text{ɪ/ε/æ} \\ [-back] \\ [-tense] \end{array} \left\{ \begin{array}{c} \text{p/b/t/d/f/v/θ/ð/s/z/m/n} \\ [+consonantal] \\ [-vocalic] \\ [-high] \end{array} \right\}$$

$$9. \emptyset \rightarrow \begin{array}{c} \text{ə} \\ [-high] \\ [-low] \\ [+back] \\ [-tense] \\ \\ \text{ɪ} \\ [+high] \\ [-back] \\ [-tense] \end{array} / \text{C} \begin{array}{c} \text{u} \\ [+high] \\ [+back] \\ [-tense] \end{array} \left\{ \begin{array}{c} \text{p/b/t/d} \\ [-continuent] \\ [-nasal] \\ [+anterior] \\ \\ \text{ʒ/ʒ} \\ [+continuent] \\ [+high] \end{array} \right\}$$

WHERE C = ANY CONSONANT, LIQUID, OR GLIDE

$$10. \emptyset \rightarrow \begin{array}{c} \text{ɪ} \\ \text{u} \\ [+high] \\ \alpha \text{back} \\ [-tense] \end{array} / \begin{array}{c} \text{ɪ/e/æ} \\ \text{u/o/ɔ} \\ \alpha \text{back} \\ [+tense] \end{array} \text{--- X}$$

WHERE X $\neq$ $\begin{array}{c} \text{r} \\ [+consonantal] \\ [+vocalic] \\ [-anterior] \end{array}$

$$\text{OPT } 11. \begin{array}{c} \text{æ} \\ [-back] \\ [+tense] \end{array} \rightarrow [-low] / \text{---} \begin{array}{c} \text{m/n} \\ [-tense] \\ [+nasal] \end{array}$$

$$12. \emptyset \rightarrow \begin{array}{c} \text{ɪ} \\ [+high] \\ [-back] \\ [-tense] \end{array} / \begin{array}{c} \text{t/d/n/ʃ/ʒ} \\ [-continuent] \\ [+coronal] \end{array} \text{---} \begin{array}{c} \text{u} \\ [+high] \\ [+back] \\ [+tense] \end{array}$$

$$13. \begin{array}{c} u/o \\ [-low \\ +back \\ +tense] \end{array} \rightarrow \begin{array}{c} \text{ɜ}/\text{e} \\ [-back \\ -front] \end{array} / \text{ } \begin{array}{c} u \\ [-tense] \end{array}$$

$$14. \begin{array}{c} i/e/\text{æ}/\text{ɜ}/\text{e}/\text{o} \\ [+tense] \end{array} \rightarrow \begin{array}{c} i/\text{ɛ}/\text{æ}/\text{ɜ}/\text{e}/\text{o} \\ [-tense] \end{array} / \text{ } \begin{array}{c} i/u \\ [-tense] \end{array}$$

$$15. \begin{array}{c} u \\ [+back \\ -tense] \end{array} \rightarrow \phi / \begin{array}{c} \text{a} \\ [-consonantal \\ +vocalic] \end{array} \text{ } \begin{array}{c} r \\ [+consonantal \\ +vocalic \\ -anterior] \end{array}$$

$$16. \begin{array}{c} \text{a} \\ [-round] \end{array} \rightarrow \begin{array}{c} \text{a} \\ [-back \\ \text{a}front] \end{array} / \text{ } \begin{array}{c} u \\ [-tense \\ \text{B}front] \end{array}$$

$$17. \begin{array}{c} i \\ [-tense \\ +front] \end{array} \rightarrow \left\{ \begin{array}{c} \text{a} \\ \phi / [-front \\ -round] \text{ } X \\ \text{e} \\ \text{e} \\ [-high \\ \text{a}back] / \begin{array}{c} \text{a} \\ \text{ɔ} \\ [+low \\ \text{a}back] \end{array} \end{array} \right\}$$

WHERE X ≠ #

$$18. \begin{array}{c} i \\ [+consonantal \\ +vocalic \\ +anterior] \end{array} \rightarrow [-back] / \text{ } \begin{array}{c} y \\ [-consonantal \\ -vocalic \\ -back] \end{array}$$

$$19. \phi \rightarrow \begin{array}{c} u \\ [+high \\ \text{a}back \\ -tense] \end{array} / \begin{array}{c} \text{a} \\ [-consonantal \\ +vocalic] \end{array} \text{ } \begin{array}{c} i \\ [+consonantal \\ +vocalic \\ +anterior \\ \text{a}back] \end{array}$$

$$20. \begin{array}{c} i/i \\ [+vocalic \\ +anterior] \end{array} \rightarrow \phi / \text{ } [-vocalic]$$

$$21. \begin{array}{c} i \\ \text{a}back \\ [-tense] \end{array} \rightarrow \phi / \begin{array}{c} \text{a} \\ [-consonantal \\ +vocalic] \end{array} \text{ } \begin{array}{c} u \\ \text{a}back \\ [-tense] \end{array}$$

22. $\begin{matrix} \text{u} \\ [+back] \\ [-tense] \end{matrix} \rightarrow \begin{matrix} \text{y} & \text{i}/\text{e}/\text{æ}/\text{a}/\text{ʌ} \\ \text{u} & \text{ʊ}/\text{ʊ}/\text{o}/\text{u}/\text{ɔ} \end{matrix} \begin{matrix} [\text{round}] \\ [-tense] \\ [\text{round}] \end{matrix} \underline{\hspace{1cm}}$

OPT 23. $\begin{matrix} \text{ŋ} \\ [+nasal] \\ [-anterior] \\ [-coronal] \end{matrix} \rightarrow \begin{matrix} \text{n} \\ [+anterior] \\ [+coronal] \\ [-high] \\ [-back] \end{matrix} / \text{C} [-tense] \begin{matrix} \text{l} \\ [-back] \\ [-tense] \end{matrix} \underline{\hspace{1cm}} \#$

WHERE C = ANY CONSONANT, LIQUID, OR GLIDE

SOME EXAMPLES

<u>crib</u> krib (8) kriəb	<u>fish</u> fiʃ (5) fiʃ (10) fiʃ (14) fiʃ	<u>bench</u> benč (5) benč (10) beinč (14) beinč	<u>think</u> θɪŋk (4) θeŋk (10) θeɪŋk (14) θeɪŋk	<u>thank</u> θæŋk (4) θeŋk (10) θeɪŋk (14) θeɪŋk
<u>sing</u> sɪŋ (4) seŋ (10) seɪŋ (14) seɪŋ (23) seɪn	<u>pen</u> pɛn (5) pɪn (8) piən	<u>fresh</u> freʃ (5) freʃ (10) freiʃ (14) freiʃ	<u>egg</u> ɛg (6) eg (10) eɪg (14) eɪg	<u>bath</u> bæθ (7) bæθ (10) bæiθ (14) bæiθ
<u>dance</u> dæns (7) dæns (10) dæɪns (11) deɪns (14) deɪns	<u>bad</u> bæd (8) bæəd	<u>foot</u> fʊt (9) fuət	<u>bush</u> buʃ (9) buiʃ	<u>food</u> fuɔd (10) fuɔd (13) feɔd (14) feɔd
<u>chewed</u> čud (10) čuɔd (12) čɪuɔd (13) čɪəuɔd (14) čɪəuɔd	<u>coat</u> kot (10) kɔt (13) kəut (14) kɔt	<u>core</u> kor (16) hwaɪ (17) hwæ	<u>dog</u> dɔg (10) dɔug (14) dɔug	<u>right</u> raɪt (16) raɪt (17) rat
<u>rat</u> ræt (8) ræət	<u>route</u> raʊt (16) rəʊt (22) ræɪt	<u>why</u> hwaɪ (16) hwaɪ (17) hwæ	<u>boy</u> bɔɪ (17) bɔə	<u>tower</u> taʊər (15) tar
<u>tire</u> taɪər (16) taɪər (17) tar	<u>Al</u> æl (19) æʊl (22) æɪl	<u>owl</u> aʊl (16) æʊl (19) æʊl (21) æʊl (22) æɪl	<u>ball</u> bɔl (10) bɔʊl (14) bɔʊl (19) bɔʊl (21) bɔʊl	<u>boil</u> bɔɪl (17) bɔəl (19) bɔəʊl (22) bɔəɪl
<u>Milly</u> mɪli (19) mɪʊli (22) mɪɪli	<u>million</u> mɪljən (18) mɪljən (19) mɪljən (20) mɪljən	<u>bulb</u> bʌlb (19) bʌʊlb (20) bʌʊb (22) bʌɪb	<u>pickle</u> pɪkəl (19) pɪkəʊl (20) pɪkəʊ (22) pɪkəɪ	

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